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Deux monographies constituent ce document. La première traite du processus d'apprentissage en vue d'en clarifier l'utilité en éducation. Le texte s'adresse aux enseignants qui cherchent à présenter efficacement la matière qu'ils enseignent; les théories à cet égard sont diverses, mais il paraît approprié de former les enseignants à l'utilization de telles théories; à cet égard l'auteur recommande la théorie de Gagné pour le domaine de l'éducation. La deuxième monographie compare l'approche individualisée et l'approche de groupe à l'égard des projets techniques en enseignement professionnel. L'auteur définit les termes et les avantages de chaque formule pour l'enseignement et discute du cas des directives individuelles dans l'enseignement selon chacune des approches.

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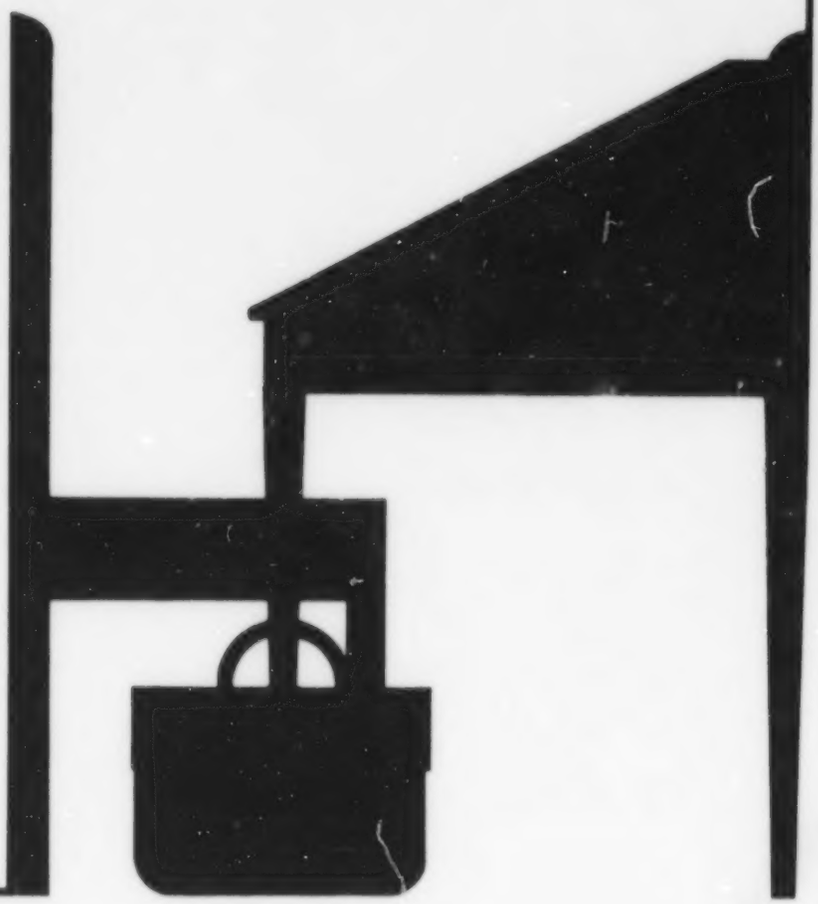

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(A) LEARNING PROCESS

(B) INDIVIDUAL OR GROUP PROJECT APPROACH

Par Claude Milette

LEARNING PROCESS

Introduction

The author's intent is to present more clearly the «learning process» as a crucial concept to those in the field of education. «Learning process» is considered a complex concept because there seems no way to get direct observation of learning taking place.

The introduction will be oriented to those who use the concept «learning process». Successively, definitions explaining the concept and a kind of suggested «learning process» that may provide strong support to the instructional events will be discussed.

It should be understood that the scope of this paper is far from an exhaustive treatment of the subject of learning. Literature on the topic is extensive and touches many fields of study. On the one hand, one may consult the philosophers to define the concept «learning process» and on the other hand, one may consult the psychologists who give interpretations of this concept. In a sense, this article relies on the psychologist views which present different interpretations of how people learn. In fact, those who use the concept must select an interpretation that works with the teaching/learning situation they have to handle. For example, this author prefers Gagné's view about the «learning process» over other views like Skinner's «contingency of reinforcement», the «Gestalt tradition of insight», Piaget and Dewey's views when regarding education and more specially vocational education which is the author's field. It seems that Gagné's view represents a theory very helpful for education when regarding curriculum development and instructional design. In fact, a teacher can refer to the theory suggested by Gagné when preparing and presenting the instructions.

Teachers' Views About Learning

Most teachers who speak about the «learning process» do not utilize a theory to explain how students acquire new knowledge, and they make a wrong judgment by thinking they understand their subject. For example, a person may differentiate students'learning styles by referring to a defined class of symbols such as practical, logical, imaginative and enthusiastic to classify their students. There is no problem in using such a classification but a teacher makes a mistake if he thinks such a classification is the «learning process». As another example, a person may learn how to solve a mathematical problem by a logical process but this process is not the «learning process» that may apply each time a person learns a new capability. The «learning process» discussed in this paper is one that always applies and can be useful whatever is the new capability a person has to learn (i.e., whatever it is information, intellectual skill, motor skill, attitude or cognitive strategy). [1]

In practice there are problems about the learning process because many models are suggested. There are some models for specific purposes in leadership or organization development. For example, Palmer reports six theories that can be very useful in their specific contexts such as decision making, problem solving with consideration of alternative solutions, how managers learn and experiential learning in groups.[2] However, these theories cannot be a general «learning process». They are types of «learning cycles» that apply to specific situations in organizational/industrial settings. These «learning cycles» appear to say: One can solve any problem by defining the problem, anticipating its solutions, collecting the data, doing the treatment and looking again at the initial problem to see if it is solved. If it is not solved properly the person must start a second cycle with the same steps. However, when related to general and vocational education at the secondary or postsecondary school levels the teachers need to refer to a «learning process» which is more appropriate to the teaching/learning situation than the Palmer's «learning cycles» can be. The knowledge about

«learning process» should help teachers to prepare and present instructional events and materials.

The understanding or awareness of the «learning process» is the interest of many persons. As a priority group teachers or facilitators can refer to such a process to focus on a problem of new acquisition of knowledge by a student. Other people in different settings need also to instruct or educate. In a hospital, for example, nurses, doctors, dieticians, therapists, and others have to teach and can refer to the «learning process.» Persons like ministers, governors, senators, judges, salesmen and managers should also understand the «learning process». However, the learner is probably the most important person that has to understand the «learning process» because he/she can refer to it each time a new and difficult learning has to be mastered and going to be useful for more success whatever learning is at school, in social life, or in the world of work.

Definitions

When defining the process of learning one realizes first that he/she is not talking about observable facts. Thus, a learner may be seen as a black box where only what goes in and what comes out are known. However, if one attempts to explain what goes on inside, he/she speculates like it was the case for many theorists who tried to clarify the meaning of «learning process».

Some persons will define the «learning process» in ways that do not indicate it is a process with phases or steps. For example, let's look at the types of expressions that could be mentioned as definitions. A first could be that «a learning process includes all the forces that interact with the human organism and affect its ability to learn.» Another type of expression that could be to define the learning process may be «the reconstruction and reorganization of experience which provides clarity to the meaning of experience and contributes to the ability of the learner in future activities or experiences». From such expressions it appears that a learning process looks like some activities

that occur when a learner is in the process of gaining knowledge or skills, or attitudes to change his/her behavior. In the following paragraphs the attention will be focused on the interpretation given by specialists who interpret the «learning process» in ways that are more appropriate for teaching purposes.

Professor Belland mentionned that «learning is a change that is internal to the learner, and which under the right circumstances would result in a different pattern of behavior.» [3] He emphasized the internality of the process and pointed out the evidence that learning appears as a change in behavior which is not attributed to physical growth or fatigue.

A way to define the internal processes of a learner is through the evidences which, by analogy, could be similar to a neurological system. In this interpretation, learning begins with some kind of sensory or perceptual signal which can be external like sight or smell or internal like heart beat or stomach spasm. In a classroom setting, the external stimulus can be provided by instructional activities presented by a teacher. When such a stimulus or perceptual signal is captured by the learner's perceptual filter it reaches a short-term memory which can hold the signal for a 20 second period or so. Then, there is a long-term memory which seems to be primarily a process of investing meaning by organizing the new stimulus in the context of previously learned stimuli. Idea or answer seems to be initated here. All the conceptual attributes already in memory apply to the new stimulus, and depending on the organizing principles a learner has, that new stimulus may get in the long-term terminal memory. Once the stimulus reaches the long-term memory, it is learned. Moreover, it appears that there is no limit of storage in a learner's long-term memory, but the retrieval or recall at a specific moment may be difficult.

In the analogy with a neurological system, it seems that learning is meaningful only if it is related to previous learning. Many authors appear to agree that what is learned by «rote memory», with no relationship with previous learning can be retrieved only by some exact

circumstances that can trigger the recall from the learner's long-term memory. However, it is different when learning is stored in a meaningful context which permits transfer of what is learned to other situations. In fact, the long-term memory appears analogous to a highly developed computer memory.

Suggestion for Teachers

A suggested «learning process» that appears to be useful to teachers in technical-vocational education is the one presented by Gagné. The affinities between Gagné's process of learning and technical-vocational education may be explained by the step-by-step process favored by technical-vocational education. In fact, Gagné's «learning process» presents eight phases that identify the internal processes that seems to occur in the learner when he learns something new.[4] Each phase can be used to present instructions and to observe the learner for evidence of an internal processing. This «learning process» becomes an effective concept to relate to technical-vocational education because teachers use different objectives that can be tested by more practical ways than in general or academic education.

The eight phases in Gagné's «learning process» are steps a learner goes through in a natural way. They can be enhanced by appropriate external support in the classroom setting. They are called motivation, apprehension, codification, retention, recall, generalization, performance, and feedback.

Definitions of each step in the learning process presented by Gagné are accepted and well understood by teachers. In order to recall the eight steps a brief explanation will be given for each of them. Motivation is a first step which is planned by teachers to be sure their learners see the advantages or reasons of making a personal effort to learn a new capability. Apprehension by the learners is a following step that concerns the selected subjects and activities involved by the program. The third step, codification is the main step because he represents the acquisition of the content of matter and skills with

appropriate activities for the learner. Retention is a step that enhances chances of better acquisition by providing activities like repetitions. Recall is a step that implies activities which refer to the learner memory. Generalization is a step which transfer to similar or equivalent situations. Performance is that step which represents the student response, and permits a feedback from the observed results whatever it is good or bad. These explanations should be considered as a brief information that is incomplete to apply Gagné's view, but enough to understand that teachers are stimulate for understanding such a theory.

A book edited by Briggs on Instructional Design shows that teachers must be considered as a team «who has to design a program which matches the conditions of learning to the instructional events». [5] This matching appears to be necessary in order to respect the «learning process.» And, this «learning process» seems to be the same for all that is learned: a small unit of knowledge, a lesson or a whole course to be mastered. The major point here is that Briggs used Gagné's view when regarding the «learning process».

In practice, teachers who use such a «learning process» in order to enhance student's learning must remember that the phases or steps may or may not always be followed by the learner in the same sequence, and a phase may or may not be used each time a learner acquires a new capability. Thus, a «learning process» should be a flexible process, and a learner should never be forced to go through each phase. A good way to look at Gagné's «learning process» is to identify where the learner is in its process before presenting any instructional event. In practice, the teacher who intended to use this «learning process» must be aware that a good understanding is the key to success. Fortunately, Gagné's «learning process» is well supported by given information, and that may be a reason why many educators respect the author.

Summary

This paper was an attempt to discuss the «learning process» in a sense that can help to clarify why it may be useful in education. It was addressed more specialy to teachers because they need to prepare and present instructional events, and they ask for ways to do it efficiently. It should be helpful to understand that teachers do not always utilize a theory to explain how students learn and that many definitions exist about the «learning process». And, as a conclusion it appears that a good way to prepare teachers could be to include in their program training about how to use a «learning process» theory. In this sense, Gagné's view appears as a good interpretation for educational purposes.

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INDIVIDUAL OR GROUP PROJECT APPROACH

Introduction

Vocational education programs include learning activities which represent the real world of work. These activities are concrete and technical projects similar to what workers do in industrial settings. In fact, such projects may be classified as industrial products or services. For example, if students are required to build an audio amplifier or to change a picture tube on a TV set in a classroom or school setting, these activities would be examples of technical projects similar to those in the world of work. In the first case, to build an audio amplifier is considered as an industrial product, while in the second case, to change a picture tube is an industrial service. In this paper the contrast between a product and a service will not be considered because both may represent good technical projects that can be used in the teaching/learning process.

However, two different types of technical project approaches used in vocational education programs will be presented. These two types of projects can be identified as «Individual Project Approach» and «Group Project Approach». As a first step, each term included in these two concepts will be defined and explanations will be given. As a second step, a more global definition about these concepts and the reasons they may be used as teaching strategies will be provided. A discussion about individualized instructions when regarding teaching from an individual and/or a group project approach will follow. Finally the last part of this paper will report some lines of research that are related to these two different strategies.

Definitions

The first term to understand in the concepts «Individual Project Approach» and «Group Project Approach» is «approach». It represents the way to teach. Henson will say that each «approach» discussed in this paper represents a specific strategy of teaching in the sense that more than one method of teaching is generally used when a teacher presents the instructional events that relate to a specific project.[1]

The second term to be defined is «project». Project is represented by the industrial product or service which include tasks to be done in a way similar to the real world of work.

A «project approach» would be defined as a project used to teach. In practice, each project approach supposes that the student(s) may acquire specific knowledge, skills, and attitudes by completing the activities related to the project in school settings like classroom, shop or laboratory. A project approach goes through a specific process or series of tasks that meet specific needs. The final result turns out to be whatever the concrete object or service might be.

The term «technical» was used to characterize the types of knowledge and skills that identify the type of technological content always a part of vocational education. For example, materials, rules of security, standards, step-by-step actions are all part of technological content.

Two other terms that need to be defined are «individual» and «group». These are key terms within the concepts «Individual Project Approach» and «Group Project Approach». Moreover, these concepts will represent two very different strategies which both are project approaches in vocational education. And, for both approaches, it is important to see the completed project as the goal to be reached. If

each learner has to complete his project by going through each step and sequence, without sharing and cooperating with others, it is and individual project approach. This approach may be used for an entire classroom. Both strategies are defined and compared in the following paragraphs.

Two Different Strategies

The «Individual Project Approach» may be defined as a strategy which consists of preparing and presenting the learning activities in a way that represents learning that has to be acquired by each learner in a group or a classroom. For example, in fundamental sciences like physic and chemistry each student follows a succession of similar instructional events which have specific relation to each other. Such activities represent an «Individual Project Approach» because they intend to help each learner to think by himself and, as a result, acquire new capabilities.

When considering technical/vocational education there are many projects which can be considered as individual projects in the sense that every student in a specific field of specialization should do them. The following examples are specimens of individual projects that can apply to different fields: to type a letter from an oral text in business education; to operate a lathe in a machine shop, to replace a tire on a wheel in automechanics, and to make a picnic table in carpentry. Such an individual project is prepared by the teacher or other designers and the student follows the process, and usually understand the logic that goes with it.

The «Group Project Approach» may be defined as a strategy which consists of solving a problem with a group of students in a school setting. In fact, such a project represents a technical object or service realized by the group's members which in a sense include the teacher. These members join their efforts by discussing, suggesting

and sharing ideas about their project. For example, if they have to develop a mass production to realize a series of identical objects, the group's members must cooperate to design the object and define their own process of production. They may have to identify and solve problems related to the cost of production, the time available and the equipment to be used. The activities realized by the group's members do not have to be identical for all members, because these members may learn different capabilities in order to complete the project. In practice, such an approach will succeed if all the students are involved and the teacher does not focus upon direct teaching.

Cooperation in project, when considering technical/vocational education, appears to be very useful to solve problems that happen in the real world of work and in normal life. The following examples are specimens of group projects from different fields: to operate an office service in business education; to modify a car for racing in auto-mechanics; to build a small house in construction and to design a project in landscape gardening in agriculture. Also, any type of mass production represents a group project approach where every participant must cooperate to obtain efficiency.

There are rationales and conditions that are related to an individual or a group project approach. On the one hand, the «Individual Project Approach» is a strategy that gives more chances for a student to concentrate on something he wants to do or understand. He/she may provide much more personal effort because it is his/her own project. It happens that a student who is left alone to carry out his/her project can think much more efficiently about each problem to be solved. Also the student's own judgment serves as feedback that is generally available from some perceptible check points which become free time for a teacher, and more time available for other types of teaching activities. An «Individual Project Approach» is useful under some conditions and not under others. The most important condition is to have projects which are well presented. As a general principle one can say that a

project must be prepared by a person or a group who has good relationships with the area and the types of knowledge, skills and attitudes a student should acquire from a specific project. It becomes important when a specific project is requested for many students to be sure about each learning activity which is part of the project. Another condition is to respect the student's learning process when a project is part of a classroom setting. For example, if a worksheet has to be followed as it happens in an industrial setting, a teacher must remember that the student faces a learning situation and he/she may need to go through some special steps when regarding his/her learning process. In that sense, the teacher must provide motivation regarding the use of a worksheet. He must explain what is going on in the different steps and be sure the student knows the terms, and the sense of each step he/she must follow. Also, a teacher has to make sure each student has a clear understanding about how to perform and how to obtain feedback for his/her actions.

On the other hand, the «Group Project Approach» is a strategy that provides chances for students to interact and perceive signals from their peers. Good leaders may have effect on the group while others may have to modify their attitudes with the group. Also, students learn that a project requires a real involvement in order to carry on the elements of different tasks. In fact a group project must not only be discussed but completed. Such a project offers to each student chances to present his/her interest and demonstrate aptitudes for some types of tasks. The one who performs well in certain tasks may be a good example for others. Similar to an «Individual Project Approach», the «Group Project Approach» is most useful under certain conditions. A very important condition is to have a teacher who can control the whole group and each student involved. In fact, a teacher must rely on a group project approach in a sense that provides positive teaching/learning activities with great concerns toward the end or goal of the project. For example, a teacher may have to provide specific information or suggestions to some students who need explanations at

the right time in order to be in phase with arguments or ideas expressed by other students. The quick learner may get more involved while the slow learner may not have enough chances to learn if a teacher's control is not maintained or well done. Another condition is related to the number of students involved in a project. As a general principle one can say that a group size should never be bigger than necessary because when there is no job for one of the group members it may be bothersome. In fact all group members must be at work in one way or another, and this is a teacher's responsibility to control the activities and provide support that makes the project a good one. In that sense a teacher must be knowledgeable in all areas of the project.

Individualized Instruction

Individualized instruction must be provided «to a certain point» in both types of approaches discussed in this paper. In fact, a teacher in classroom setting cannot deny that the student is the main agent, the one who learns, and the one who needs to be helped when there is no possible connection between the previous learning and the new one. Also, a teacher knows he/she is not teaching effectively when the instructional events do not have positive effect on his/her learner(s). However, when considering a normal classroom setting, a teacher needs to teach the whole group of students and there is no way to do it on a one to one basis. Thus, it is only «to a certain point» that a teacher can individualize instruction.

A paper written by Reagan[2] explains the concept of individualization as one that can be misguiding because there are different meanings attached to the concept, and as a result it is not a clear concept to all concerned. For example, one view says instruction is individualized when it is tutorial, another view says instruction is individualized when it is appropriate for the individual who receives it, and a third view says instruction is individualized when the student is taught that in which he is interested. In fact, Reagan's paper shows

that one cannot use individualized instruction without providing explanations about the specific meaning attached to his/her intention of individualization. He also mentioned that «one of the most common complaints of teachers is that classes are much too large, that class needs to be reduced drastically. . . However (reduction) seems unlikely because of cost. And a modest reduction may not have effect on the effectiveness of teaching.»[3] To conclude Reagan's discussion one can see a class of 20, 25, or 30 students is a normal classroom setting for a teacher, and with such a class he cannot individualize all the instruction. However, differences between students may be pertinent to a point that the schooling process has to be adapted in order to keep each student in the group. The problem is how to do it efficiently (minimum of expense or effort) and effectively (learning is provided to each student).

Researches

Because it is very important to offer individualized instruction and to be in phase with the reality one must look to research. There is a field of research related to the instruction that looks to the aptitudes of students in order to provide them different instructional events or procedures to reach the learning outcomes of a specific program. This field is identified the Aptitude-Treatment Interactions (ATI). Solomon mentions these researchers as being «opposed to the search for one 'best' method or instructional treatment.»[4] In a typical ATI research, an instructional treatment ought to match some types of learners more than others. Solomon defines three modes of intervention that apply to instructional treatment.[5] For one, there is the «remedial mode» which provides treatment to overcome learning deficiencies like for disadvantaged learners, or slow learners. For example, repetition exercises may be useful for such treatment. A second mode is the «compensatory mode» which tries to compensate or circumvent the deficiencies. For example, a handicap should receive appropriate treatment for some specific learning. A third mode is the «preferential mode» which tries

to use students' better perceptions to suggest specific types of activities. In fact, a teacher should capitalize on the strong points that characterize a student. Thus, there are those three modes of intervention a teacher could use to present some specific instructional events inside an «Individual Project Approach» or a «Group Project Approach», and make a move toward individualized instruction.

Another type of research which is called the field dependency or independency may be related to the «Individualized Project Approach» and the «Group Project Approach». This notion is well explained in an article by Witkin et al. which says that some learners work better in a field independence situation because they can set their own internal criteria.[6] These learners may get irritated when their learning is related to other learners. As a result, one can think a «Group Project Approach» may be a difficult learning exercise for some types of students. On the other hand some students learn better in a field dependence situation when they may be reinforced by their peers or the teacher for every new learning situation. Such learners could be at ease in a Group Project Approach. However, it may not be wise that a learner always learns either from a field dependency or independency situation because it is his/her better way to learn.

In practice, it would be interesting for a teacher to know who is a field dependent or independent learner when an «Individual Project Approach» or a «Group Project Approach» is used. For example, a study by Witkin mentions that students from College of Education appear to be field dependent while those from Engineering appear to be field independent. If such information were available in a classroom, the teacher could analyze the difficulties some students have to perform in such and such settings. These research findings also apply to a teacher who seems to provide higher evaluation when a student learns the way he/she learns (i.e., field dependent or independent).

Summary

In this paper, the author attempted to present two different types of project approaches that are used for specific purposes in technical/ vocational education. He defines the «Individual Project Approach» and the «Group Project Approach» as two strategies to be used in classroom setting when regarding a technical project. Also, he attempts to provide rationales regarding the use of both strategies and identifies some conditions for success. For example, the «Group Project Approch» is useful to provide chances of interaction between students. The problem of individualized instruction was also discussed because «to a certain point» both strategies should respect each student. Finally, in a last part, two different types of researches that could help teachers who intend to teach with a project approach were identifield. For one the ATI researchers offer three modes of intervention for learners while the other type of researchers identify two types of learner, the field dependency and the field independency. Both types of researches are related to the problems a teacher faces when using the Individual and/or the Group Project Approach. As a conclusion, one may understand that a project used as classroom activities for students who should acquire new capabilities needs always to be clarified.

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